tion is given. The payments consist of an entrance-fee of 5 fl., and a payment of 50 fl. per annum; and in addition 6 fl. is charged for every day's work of 7 hours in the chemical laboratory; 10 fl. for 2 afternoons of 3 hours in the physical laboratory.

In addition to the subjects required in each special department, lectures or instruction are given in the following subjects, and attendance at some of them is strongly recommended to all students, in order to give a wider culture than would be attained by exclusive attention to his special pursuit:—(1) Exercises in Literature and History; (2) the French and English Languages; (3) the General History of Art; (4) National Economy; (5) Commercial Knowledge; (6) the Principles of Jurisprudence; (7) Physical Geography; (8) Zoology; (9) Systematic Botany; (10) Singing and Gymnastics.

The course in the Lower School extends over two years, in which the following subjects are compulsory:—First year. (1) History and Literature with the German Languages; (2) Higher Algebra; (3) Stereometry and Trigonometry; (4) French; (5) Outline Geometry; (6) Free-hand Drawing. Second year. (1) History and Literature with the German Language; (2) Analytical Plane Geometry; (3) Algebraic Analysis, the Differential and Integral Calculus; (4) Higher Algebra; (5) Experimental Physics; (6) Mechanics; (7) French; (8) Free-hand Drawing; (9) Outline Geometry.

In the special schools for Architecture, Engineering, Mechanics, Technical Chemistry, and Agriculture, the entire course extends over a period of from two to four years. The extent to which the studies are carried will be illustrated by the following abstracts of the curriculum in the Agricultural School, the shortest of the courses:—First year (1) Experimental Physics; (2) Experimental Chemistry; (3) Chemical Exercises; (4) Histology and Morphology; (5) Vegetable Physiology; (6) Systematic Botany (with excursions); (7) Zoology; (8) Mineralogy; (9) The Study of Rocks; (10) Anatomy of Domestic Mammalia; (11) Physiology of Domestic Mammalia; (12) External form of Domestic Mammalia; (13) Agricultural Implements and Machines; (14) National Economy; (15) Mathematics; (16) The Drawing of Plans. Second year—(1) Chemical Exercises; (2) Agricultural Chemistry; (3) Practical Microscopy; (4) Practical Physiology; (5) The Diseases of Plants; (6) General Agriculture; (7) Special Agriculture; (8) General Breeding of Animals; (9) Special Breeding of Animals; (10) The Commerce of Agriculture; (11) The Cultivation of Garden, Orchard, and Vine; (12) Internal Diseases of Domestic Mammalia; (13) External Diseases of Domestic Mammalia; (14) Technology (Heating and Lighting); (15) Agricultural Book-keeping; (16) Irrigation, Tilling, &c.; (17) History and Literature of Agriculture; (18) Practical Geometry.

To assist in the studies of the pupils there are chemical and physical laboratories, an experimental farm, mineralogical, zoological, and botanical collections, models of machinery, designs, libraries, excursions into the country, &c. Under special circumstances students can be admitted as "Hospitanten" to certain only of the studies, without going through the entire course; but care is taken that this does not interfere with the regular studies of the other students.

LAKE VILLAGES IN SWITZERLAND

IT is satisfactory to find that the correspondents of some of the daily journals are now in the habit of giving scientific information to their readers. The following is taken from the *Standard*:—

"An interesting archæological discovery has recently been made on the shores of the Lake of Bienne. The Swiss Government has been for a long time endeavouring to drain a considerable tract of land between the two lakes of Morat and Bienne, but in order to do this effectually it has been found necessary to lower the level of the latter by cutting a canal from it to the lake of Neuchatel. At the beginning of the present year the sluices were opened, and the waters of the Lake of Bienne allowed to flow into that of Neuchatel. Up to the present time the level of the Bieler See has fallen upwards of three feet, and this fall has brought to light a number of stakes driven firmly into the bed of the lake. This fact becoming known, a number of Swiss archæologists visited the spot, and it was decided to remove the soil round these stakes to see whether any remains of a Lacustrine village, which they suspected had been raised upon them, could be traced. At a distance of between five and six feet from the present bed of the lake the workmen came upon a large number of objects of various kinds, which have been collected and are at present under the custody of Dr. Gross, of Locrass. Among them are pieces of cord made from hemp, vases, stags' horns, stone hatchets, and utensils used apparently for cooking. The most precious specimen is, however, a hatchet made of néphrite (the name given to a peculiarly hard kind of stone from which the Lacustrines formed their cutting instruments). This hatchet is sixteen centimetres long by seven broad, and is by far the largest yet discovered in any part of Switzerland, no other collection having any measuring more than eight centimetres in length. A quantity of the bones found at the same time have been sent to Dr. Uhlmann, of Münchenbuchsee, for examination by him, and he finds that they belong to the following animals, viz.:—stag, horse, ox, wild boar, pig, goat, beaver, dog, mouse, &c., together with a number of human bones. If the level of the lake continues to sink, it is hoped that further discoveries will be made, and the scientific world here is waiting the result of the engineering operations with keen interest."

NOTES

WE have great pleasure in announcing that Prof. Andrew C. Ramsay, F.R.S., has been appointed Director-General of the Geological Survey in the room of the late Sir Roderick I. Murchison.

AT the moment of going to press we have received the announcement of the death of Prof. Goldstücker, the eminent Sanscrit scholar. He died on Wednesday morning.

MR. G. B. AIRY, the Astronomer Royal, and Prof. Agassiz, were elected foreign associates of the *Académie des Sciences* at Paris in the room of the late Sir J. Herschel and Sir R. I. Murchison at the meeting on the 26th ult.

DR. MAXWELL SIMPSON, F.R.S., has been elected as successor to the late Dr. Blyth in the chair of Chemistry, Queen's College, Cork. Dr. Simpson is well known to men of science at home and abroad as an accomplished chemist, and one who has been especially distinguished for his original researches.

THE Crystal Palace Company's School of Art, Science, and Literature is about to take an important step, having for its object the emphasising of the science branch of the school, in order that eventually the south of London may be provided with an institution which, in a measure, may represent the Royal and London Institutions which already exist in the west and centre. The step consists in adding to the courses of lectures on scientific subjects already given special courses to be given from time to time by scientific men of eminence, similar to the courses given in the Institutions before referred to; and it is hoped that the same lectures and the same standard of excellence and illustration may be secured. As the lecture theatre of the school has been burnt down, the lectures, pending its rebuilding, are to be given in the theatre in the Crystal Palace; but it need scarcely be stated that these lectures have no connection with the Crystal Palace, except so far as the School of Art, Science, and Literature is connected with it, and that they will be given at a time when the

Palace is closed to the general public. Mr. Norman Lockyer has consented to give the first course of lectures. This step taken by the Committee is in every way to be commended, and we look with confidence to the success of these lectures as paving the way for others in various parts of the country, which may eventually do much towards popularising Science among the masses.

PROF. P. MARTIN DUNCAN, F.R.S., is now delivering the course of Lectures on Biology to the class for the Higher Education of Women at South Kensington, in the place of Prof. Huxley, who is still in Egypt for the complete restoration of his health.

MR. W. MARSHALL WATTS, D.Sc., of the London University, has been appointed to an assistant mastership in Giggleswick Grammar School, Yorkshire. The governors have settled that chemistry, including practical work in a laboratory, and physics, shall hereafter be taught in the school, and the teaching of these branches of science has been entrusted to Dr. Watts. Until recently Dr. Watts has had the main charge of the teaching of chemistry in the Manchester Grammar School, a school which has been eminently successful in obtaining scholarships in physical science at Oxford. Mr. E. K. Purnell, Scholar and Prizeman of Magdalen College, Cambridge, has also lately been appointed to a classical mastership in Giggleswick School.

THE Council of the St. Andrews Medical Graduates' Association are about to appeal to the many friends of the late Professor of Medicine in the University of St. Andrews, to aid them in an attempt to make a more fitting provision for his widow than Dr. Day's ill-health allowed him to accomplish. We regret to learn that such an appeal is necessary, and heartily wish it success.

THE Haberdashers' Company have recently awarded Mr. Webb, the Senior Wrangler of Cambridge, 50*l*. for three consecutive years; he having been a pupil of the Rev. C. M. Roberts at Monmouth, of which school the Haberdashers' Company are governors. They also propose to grant four exhibitions of 50*l*. to the children or grandchildren or apprentices of Liverymen of the Company under certain restrictions, to be tenable for three years. In addition to the above, one exhibition of 50*l*. will be specially granted to a scholar of any school under the Company's management. The sum of 150*l*. will also be appropriated towards assisting the education of children of the Livery of the Company. 100*l*. yearly will also be awarded as a prize to the inventors of anything new in haberdashery.

AS the period of the Transit of Venus in 1874 approaches, astronomers both at home and abroad are becoming more and more active in their preparations; and the American committee on this subject, it is understood, has already decided in considerable part upon the stations to be occupied. Of the result of their conclusions we hope to give an account before long to our readers. In Russia the committee, under Prof. Struve, proposes the establishment of a chain of observers, at positions 100 miles apart, along the region comprised between Kamschatka and the Black Sea. The German committee has decided on recommending the organisation of four stations for heliometric observations of the planet during its transit, one of them in Japan or China, and the others probably at Mauritius, Kerguelen, and Auckland islands; and three of these, with the addition of a fourth station in Persia, between Mascate and Teheran, will be equipped for photographic observations also. The French, before the war, suggested that stations be established at St. Paul Island, New Amsterdam, Yokohama, Tahiti, Noumea, Mascate, and Suez. How far this programme will be carried out under the changed circumstances of that country remains to be seen.

WE have received a letter from a valued correspondent, calling attention to some defects in the arrangements for the study of the Natural Sciences, and especially of Botany, at the University of Cambridge. The letter we refrain from publishing, in the belief that the good work which is now proceeding at the Universities will be carried out eventually far more completely than it is at present, and that even Botany may ultimately receive the attention that it deserves.

THE Brazilian steamer to New York brings advices of the safe arrival at Pernambuco of the steamer *Hassler*, with Prof. Agassiz and party. They were to leave for Rio Janeiro, in company with the *Ticonderaga*, on Jan. 16. As there are several gentlemen on board who have undertaken to supply information in regard to the movements of the vessel, we shall doubtless before long have full accounts of the progress made up to the date mentioned; although in regard to the subject of deep-sea soundings and supposed discoveries connected therewith we must probably wait, for correct details, for the official report to be made by Count Pourtales direct to the Superintendent of the Coast Survey.

THE "Annual Report of the Secretary of the Interior for the United States on the Operations of the Department for the year ending October 31, 1871," states that the results of Prof. Hayden's expedition, in accordance with his instructions to investigate the geology and natural resources of the little known, but interesting, region about the source of the Yellowstone and Missouri rivers, shows it to have been a complete success, and fully to justify the liberal provision made by Congress for it. A preliminary report of the results was to be presented to Congress at an early date. A great amount of valuable notes and specimens, illustrating the agricultural, mineral, zoological, and botanical wealth of the West, was secured.

WE learn that the Smithsonian Institution has recently succeeded in obtaining two complete skeletons of the remarkable tapir of the highlands of the United States of Colombia, known to naturalists as *Tapirus pinchaque* or *roulini*. Previously only the skull had been obtained by Roulin, by whom it was first made known, and it was one of the rarities of the great anatomical collection at Paris. The Smithsonian Institution had before obtained a number of skulls and a skeleton of the still more remarkable tapir of Panama, which had remained undistinguished from the common species of Panama till within a few years, when first described, under the name of *Elasmognathus bairdii*, by Prof. Gill, from two skulls in the Smithsonian collection. There are no external or dental differences between the tapirs corresponding with the marked differences in the skulls; the external differences being confined to the contour of the forehead, the colour, and the character of the hair. In the mountain tapir, as might be expected in an animal dwelling in such elevated regions, the hair is long and coarse, and is of a black colour, strongly contrasting with that of the common tapir of South America; it is also somewhat smaller than that species, and has the forehead less arched from the occiput. It is confined to the highlands, and is separated, at least so far as is known, by quite a wide band of country from the common species.

THE Report of the officers of the Peabody Academy of Sciences of Salem, lately made to the trustees, presents a satisfactory statement of the progress made during the past year. This establishment received a moderate endowment from George Peabody, of London, and the income is expended in the care of the valuable museum belonging to the Academy. The directors of the establishment are Mr. F. W. Putnam and Dr. Packard. The principal additions to the museum of the Academy during the year have consisted mainly of insects and archæological specimens, and also a series of the animals inhabiting the Mammoth Cave of Kentucky. All of these, together with the collections previously in the museum, have been properly arranged and classified, and tend to render the museum very attractive. The report urges very strongly the propriety of securing an additional endowment, to enable the Academy to publish in its memoirs certain valuable scientific manuscripts now in hand, the alternative of being obliged to send them to some other establishment having more means at its disposal being greatly deplored, as they were based upon the collections of the Academy, and should legitimately appear under its auspices.

THE Clifton College Scientific Society has just issued the second part of its Transactions, containing the record of its proceedings from February to July, 1871. The president and secretary state in their Report that the papers read at the Society's meetings have been as numerous as previously, and the attendance of members and visitors has in no degree fallen off; and that, although there is still much to be desired in this respect, yet the number of working members is steadily increasing. The various sections of botany, zoology, entomology, geology, archæology, chemistry, and physics have, on the whole, done good work, the least satisfactory reports being in the case of zoology, chemistry, and physics. The great event of the half-year has been the long-expected opening of the new Museum and Botanic Garden, both of which institutions are well deserving of support from those outside the school who are able to assist in furnishing them. The Botanic Garden is already one of the very best to be met with anywhere in the provinces. Among the papers read before the society and printed in the Transactions, the following have struck us as especially excellent:—"A Scientific Visit to Cheddar," by the President and J. Stone; "The Church of St. Mary Redcliffe, Bristol," by R. W. Wilson; "The Coalfield of South Wales," by A. Cruttwell; "The Birds of Clifton," by D. Pearce; and an admirable paper on "The Spectrum," by W. A. Smith.

THE last number of the *Bulletin de la Société de Géographie* contains an article by Delesse on the oscillations of the coasts of France.

THE Annual Address, delivered before the Albany Institute, New York, by Orlando Meads, on May 25, 1871, has just reached us. It is chiefly occupied with a sketch of the history of this successful and enterprising institution.

THE *Poona Observer* of February 6 gives the following account of Indian Geological Excursions:—"The Principal of the Poona Civil Engineering College, Mr. T. Cooke, together with the Professor of Chemistry, Mr. S. Cooke, with about twenty students of the first class, proceeded on a geological excursion on January 29, and arrived here on Saturday morning last. After leaving Poona they arrived at Shabad, where they remained for a whole day. The next morning they left Shabad and arrived at Krishtna at about ten in the morning, and inspected the Krishtna Bridge. After inspecting several works of the G. I. P. R., they started for Poona on the afternoon of Friday. The thanks of the students as well as of the Principals are due to the G. I. P. R. Company, in kindly placing their waiting-rooms at the several stations where they halted, at the disposal of the boys. The expense of this excursion is to be borne solely by Government. The amount allotted for the purpose of this excursion was 500 Rs."

THE following account of the Aurora of February 4 appears in the *Times of India* of the following day:—"A magnificent Aurora was visible, from the Rawul Pindee portion of the Punjaub, last night, February 4, from 12 to past 12.30 o'clock. It occupied the northern quadrant of a clear sky, or rather more, the stars shining dimly through a glowing deep red hazy light reaching half way up the heavens, and which was crossed by thin vertical rays of white light stretching to the south. The night was calm but less frosty than usual at this season, and the oldest inhabitant who witnessed the display averred he had never seen anything like it in his life before." The suggestion made by our correspondent Mr. Earwaker, that we witnessed on that day a combination of the Northern and Southern Aurora, is thus confirmed.

SCIENCE IN PLAIN ENGLISH

IN a paper under this heading, in the *Boston Journal of Chemistry*, Mr. C. A. Joy, after quoting from our articles of June 22 and 29, 1871, proceeds thus:—We must admit that what Mr. Rushton says of English schools applies equally well to our own. Does anybody know of a preparatory school in the United States where instruction in science is given on a systematic plan by teachers especially fitted for the work, and with well-selected apparatus and judicious text-books, and where an equal value for excellence in science is given to pupils as for mathematics and the languages? There are, doubtless, some such schools, but it is my misfortune never to have heard of them. The truth is, there are few teachers. The custom in this world of studying everything else but the world we live in, which has been handed down to us from our ancestors, has precluded the possibility of anybody being fitted to teach the natural sciences excepting the few who have had the energy and the means to overcome every obstacle, and to learn something; and they are so rare that they are not to be had for ordinary schools. We are now in a fair way to acquire considerable knowledge of the planet Mars, its climate and physical condition; and it may be that we shall some day be favoured by a visit from an inhabitant of that distant world. The arrival of such a visitor would be rapidly heralded over the land, and he would be introduced to our best society, to the leading men of education; and as he would doubtless be possessed of an inquiring turn of mind, he would have many embarrassing questions to ask. He might address the inquiry to the gentleman on his right at the public dinner, which would be sure to be given to him, as to the composition of the crust of the earth; or he might ask what the glass windows were made of, and what form of light shone through them, or the water on the table and the air of the room might absorb his attention. If the respondent happened to be a University bred man the chances are ten to one he could not answer a single question; he would be forced to say that the study of the language of a people formerly occupying a small portion of the globe had monopolised all of his time, and prevented the acquisition of a knowledge of any of the natural phenomena around him; he might, in fact, have more knowledge of Mars than of the earth. It is probable that our visitor would be slightly astonished at the ignorance of the best educated members of the community. I do not know that we are bound to prepare ourselves for the approaching visit, but the very suggestion of it ought to startle us a little out of our propriety, and make us review the course of instruction we have pursued for so many years. As long as the requirements for admission to college are left just as they are at present, all persons who expect to go to college must follow a prescribed course or be found wanting. The teacher in a preparatory school knows that the pupil can attend only a certain number of hours, and to get up his task for admission to college nearly all this time must be devoted to classical studies. There is no time left for science, and it is not taught. This state of things has led to a violent controversy on the part of the advocates of the two systems, and the question appears to be no nearer a solution at the present time than it was many years ago. The advocates of classical training will not yield an inch of ground, and the scientists are equally firm. It is a pity that some compromise cannot be affected, as a knowledge of Latin and Greek is of great value to the scientific student, and ought not to be omitted. And as the classicists now have the colleges in their power, would it not be well for them to recommend a knowledge of language rather than of grammar, and a facility of reading generally instead of prescribing the precise number of chapters and verses? If the teacher of Chemistry, for example, were to insist upon the students studying 100 pages of Miller, 50 pages of Roscoe, two books of Gerhardt, the correspondence of Lavoisier, and the life of Berzelius, before presenting himself for examination, he would be looked upon as slightly deranged; and yet this is precisely what is done by our classical friends. A chemist can tell in half an hour whether the candidate is prepared to go on with a certain class; and he cares not how, when, or where the applicant obtained the knowledge. Not so our classical friends; they insist upon chapter and verse as if there were a charm in the prescribed number—and by so doing they do great harm to our schools. A friend of mine desired to put his son at a select school, and had a long conversation with the principal in reference to the studies he would have to pursue in order to fit him for college. The principal had the experience of thirty years in his calling, and